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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of: **YOSHIKAWA, Kota**

Group Art Unit:1774

Serial No.: **09/916,314**

Examiner: **Dawn L. Garrett**

Filed: **July 30, 2001**

P.T.O. Confirmation No.: 8261

For: **ORGANIC EL ELEMENT AND METHOD OF MANUFACTURING THE SAME,
ORGANIC EL DISPLAY DEVICE USING THE ELEMENT, ORGANIC EL MATERIAL,
AND SURFACE EMISSION DEVICE AND LIQUID CRYSTAL DISPLAY DEVICE USING
THE MATERIAL**

SUBMISSION OF APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

June 16, 2004

Sir:

Submitted herewith are an original and two copies of an Appeal Brief in the above-identified U.S. patent application.

Also enclosed is a check in the amount of **\$330.00** to cover the cost of filing this Appeal Brief. In the event that any additional fees are due with respect to this paper, please charge Deposit Account No. 01-2340. This paper is filed in triplicate.

Respectfully submitted,

ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP

Daniel A. Geselowitz, Ph.D.

Attorney for Applicant
Reg. No. 42,573

DAG/xl
Atty. Docket No. **010935**
Suite 1000
1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930



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PATENT TRADEMARK OFFICE

Enclosures: Duplicate of this paper; Appeal Brief and two copies; and check for \$330.00



THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appeal No: Not yet assigned

In re the Application of: **YOSHIKAWA, Kota**

Group Art Unit: 1774

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ORGANIC EL DISPLAY DEVICE USING THE ELEMENT, ORGANIC EL
MATERIAL, AND SURFACE EMISSION DEVICE AND LIQUID CRYSTAL
DISPLAY DEVICE USING THE MATERIAL**

BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

June 16, 2004

Sir:

I. REAL PARTY IN INTEREST

The real party in interest is Fujitsu Limited, of Kawasaki-shi, Japan, as evidenced by the assignment filed on July 30, 2001, and recorded on reel 012031/frame 0546.

II. RELATED APPEALS AND INTERFERENCES

Applicant is aware of no other appeal or interference which will directly affect, be affected by, or have a bearing on the Board's decision in the pending appeal.

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III. STATUS OF CLAIMS

Claims 2 and 4-20 are pending in this application. Claims 1 and 3 have been canceled in the course of prosecution of this application, and claims 4-19 are currently withdrawn from consideration. Claims 2 and 20 stand rejected, and claims 2 and 20 are on appeal.

IV. STATUS OF AMENDMENTS

No amendment has been made to the claims subsequent to the final Office action mailed November 26, 2003. (The Response under 37 CFR 1.116 filed on February 26, 2004, proposed no amendment.)

V. SUMMARY OF THE INVENTION

Claim 2:

Claim 2 generally corresponds to the first embodiment, described in the specification starting on page 17, line 15 and illustrated in Fig. 1.

Claim 2, line 1: "**A**n organic EL element, comprising.". "EL" is an abbreviation for "Electroluminescence", and organic EL elements of the background art are discussed starting on page 1, line 18, of the specification. Electroluminescence elements are light emitting elements which may be used, for example, in displays of electronic devices of the sort in which LED's or liquid crystal displays are sometimes used.

Claim 2, line 2: "**a**n organic EL layer formed between **a**n anode and **a** cathode; and".

This line requires three components: an anode, a cathode, and an organic EL layer. The Background

section discusses the general structure of an organic EL layer (EL emission layer) between a cathode and an anode on page 2, lines 10-12. This general structure is disclosed with regard to the present invention on page 8, lines 3-4, and subsequent portions of the specification. This general structure may be seen, for example, in Fig. 1 of the present invention, illustrating anode 12, organic EL layer 13 and cathode 14, as described on page 17, line 19, to page 18, line 3.

Claim 2, lines 3-6: "**said cathode consisting of a first conductive film that contacts to said organic EL layer and a second conductive film that constitutes a laminated structure together with said first conductive film, said first conductive film containing any one of an alkaline metal and an alkaline earth metal, and**". The cathode in claim 2 consists of a first conductive film (14a in Fig. 1) and a second conductive film (14b in Fig. 1), as described on page 17, line 25, to page 18, line 3). The disclosure that the first conductive film may contain an alkaline metal or an alkaline earth metal may be found on page 18, lines 12-15.

Claim 2, lines 7-9: "**said second conductive film containing any one of at least one type metal selected from the group consisting of Ru (ruthenium), Rh (rhodium), Ir (iridium), Os (osmium), Re (rhenium) and the oxides of Ru, Rh, Ir, Os and Re**". The disclosure that the second conductive film may contain Ru, Rh, Ir, Os, Re, or an oxide of one of these metals, may be found on page 18, lines 19-24.

Claim 20:

Claim 20, line 1: "**An organic EL element comprising:**" Organic EL elements are discussed above in regard to claim 2.

Claim 20, line 2: "**an organic EL layer formed between an anode and a cathode; and**" The general structure of an anode, a cathode and an EL layer may be seen, for example, in Fig. 1 of the present invention, illustrating anode 12, organic EL layer 13 and cathode 14, as described on page 17, line 19, to page 18, line 3.

Claim 20, lines 3-5: "**said cathode consisting of a first conductive film that contacts to said organic EL layer and a second conductive film that constitutes a laminated structure together with said first conductive film, said first conductive film containing any one of an alkaline metal and an alkaline earth metal,**". The cathode in claim 2 consists of a first conductive film (14a in Fig. 1) and a second conductive film (14b in Fig. 1), as described on page 17, line 25, to page 18, line 3). The disclosure that the first conductive film may contain an alkaline metal or an alkaline earth metal may be found on page 18, lines 12-15.

Claim 20, lines 6-9: "**... and said second conductive film is formed of a laminated film consisting of:**"

a conductive film containing any one of at least one type metal selected from the group consisting of Ru, Rh, Ir, Os, Re and the oxides of Ru, Rh, Ir, Os and Re, and any one of a TiN film and a laminate film formed of a Ti film and a TiN film on said Ti film." In claim 20, the second conductive film consists of a laminate of two films, one of which

may further be a laminate itself. The specification discloses on page 19, lines 11-16, that the second conductive film may be a laminated film consisting of two films: "the conductive film ... and the TiN film or the TiN/Ti film". The conductive film contains Ru, Rh, Ir, Os, Re or an oxide of one of these metals (page 19, lines 12-14) and the other film may be TiN or a TiN/Ti film (i.e., a laminate of Ti and TiN) (page 18, lines 14-15). The laminated structure of second conductive film recited in claim 20 is not specifically illustrated in Fig. 1, in which second conductive film 14b is shown only as a single layer.

VI. ISSUES

As stated in the final Office action mailed November 26, 2003, the issues are:

- A. Whether claim 2 is unpatentable under 35 U.S.C. 103(a) over Tamano et al. (U.S. Patent No. 5,811,834).
- B. Whether claim 20 is unpatentable under 35 U.S.C. 103(a) over Tamano et al. (U.S. Patent No. 5,811,834) in view of Arai et al. (U.S. Patent Publication No. 2001/0041268).

VII. GROUPING OF THE CLAIMS

For purposes of appeal, the claims do not stand or fall together. Appellants note that claims 2 and 20 are subject to separate rejection issues, and separate arguments for why claims 2 and 20 are patentable are presented below.

VIII. ARGUMENTS

A. Whether claim 2 is unpatentable under 35 U.S.C. 103(a) over Tamano et al. (U.S. Patent No. 5,811,834).

1. Errors in the rejection

In this section (section VIII.A.1.) of the Appeal Brief, Appellants address the errors in the rejection as stated by the Examiner. In section VIII.A.2., below, Appellants address how the limitations of claim 2 render the claim unobvious over the prior art and Appellants address the Examiner's "Response to Arguments" from the final Office action.

In paragraph no. 6 of the final Office action dated November 26, 2003 (paper no. 9), the rejection of claim 2 is maintained as set forth in paragraph no. 10 of the Office action dated June 23, 2003 (paper no. 7). In that Office action, the Examiner cites column 23, line 56, through column 24, line 48, of Tamano et al. as disclosing organic electroluminescent devices comprising organic material between electrodes. The Examiner then states:

"The cathode may be formed of two layers or more and include materials such as magnesium and calcium (which are alkaline earth metals per the "first conductive film") as well as titanium and ruthenium per the instant "second conductive film". Although Tamano et al. fails to exemplify a device comprising a cathode comprising two layers wherein the layer closest to the organic layer is an alkaline metal or alkaline earth metal and the outermost layer is composed of titanium or ruthenium, it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed such a two-layered cathode, because Tamano et al. teaches a two layered cathode may be formed and teaches alkaline metals, alkaline earth metals, titanium and ruthenium as materials for the layers." (emphasis in original)

In pointing out the errors in this rejection, Appellants note that MPEP 2142 provides:

“To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) **must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art**, and not based on applicant’s disclosure.” (Emphasis added)

In addition, MPEP 2143.01 states:

“Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art.”

Appellants concur that Tamano et al. discloses an organo-electroluminescence device with a multi-layered organic thin film between an anode and a cathode (column 23, lines 39-41).

However, the Examiner is apparently indicating that Tamano et al. suggests the specific structure recited in claim 2. Appellants disagree and argue that the Examiner has not indicated a proper suggestion in the reference for **all the claim limitations**.

Claim 2 recites several structural/compositional limitations on the cathode. First of all, the cathode consists of two films: a first conductive film that contacts the organic EL layer, and a second conductive film. Secondly, the first conductive film contains any one of an alkaline metal and an alkaline earth metal. Thirdly, the second conductive film contains any one of ruthenium, rhodium, iridium, osmium, rhenium and the oxides of these metals.

With regard to the first limitation, that the cathode **consists of** two films, the Examiner is apparently referring to the disclosure in Tamano et al., column 24, line 40-48:

“The electrically conductive material used for the cathode is suitably selected from those having a work function of smaller than 4 eV. This electrically conductive material includes magnesium, calcium, tin, lead, titanium, yttrium, lithium, ruthenium, manganese, and alloys of these. Typical examples of the alloys include magnesium/silver, magnesium/indium and lithium/aluminum, while the alloys shall not be limited to these. Each of the anode and the cathode may be formed of two layers or more as required.”

That is, the Examiner refers to the statement that “Each of the anode and the cathode may be formed of two layers or more as required” as a suggestion for two or more layers in the cathode.

Appellants concur that there is a general suggestion in these lines of Tamano et al. for a cathode having two or more layers (that is, a “first conductive film and a second conductive film). However, Appellants argue that these lines of Tamano et al. do **not provide a suggestion for the additional limitations** in claim 2. This lack of suggestion is discussed in further detail in section 2., below. **The errors in the rejection are that the Examiner has not specifically addressed these limitations nor noted any specific suggestion in the reference for these limitations, and that the Examiner has given an improper motivation for modifying the reference.**

The Examiner indicates that “Tamano et al. fails to exemplify a device ...” having the claimed limitations. This is certainly true, but this statement avoids the fact that Tamano et al. also **fails to suggest** the specific structural/compositional limitations. The Examiner indicates **no specific suggestion** for these limitations.

The motivation for modifying the reference, as stated by the Examiner, is that “Tamano et al. teaches a two layered cathode may be formed and teaches alkaline metals, alkaline earth metals, titanium and ruthenium as metals for the layers.” Appellants respectfully submit that this statement by the Examiner again avoids the issue of lack of suggestion for the specifically recited

structural/compositional limitations. The Examiner refers only to Tamano's listing of possible materials for the "electrically conductive material used for the cathode". However, this does not address the use of particular metals in particular layers.

Therefore, Appellants respectfully argue that the Examiner has failed to state a proper *prima facie* case of obviousness in the rejection of claim 2.

2. The specific limitations in the rejected claims which are not described in the prior art relied on in the rejection, and how the limitations render the claimed subject matter unobvious over the prior art.

Appellants have argued in section 1. that the Examiner has failed to state a proper *prima facie* case for claim 2, by virtue of failing to indicate where Tamano et al. suggests the limitations of claim 2 and by failing to point out a motivation in the reference for modifying the teachings of Tamano et al. to produce the invention of claim 2.

Appellant here further review the teachings of Tamano et al. to demonstrate that there is no suggestion in the reference for the limitations of claim 2, nor any motivation in the reference for modifying the reference to produce the present invention.

The only suggestion in Tamano et al. for having two layers in the cathode appears to be column 24, lines 47-48, which state: "Each of the anode and the cathode may be formed of two layers or more **as required**". Appellants note three main points about this sentence:

- a. The phrase "as required" is not explained.
- b. This phrase refers to either cathode or anode.

c. Column 24, line 40, refers to the “electrically conductive **material**” of the cathode. The implication is that the cathode is made from a **single material**, which can be one of the metals or alloys listed. There is absolutely **no suggestion** that if the cathode were formed of two or more layers, that these layers would be of different materials.

That is, the only motivation for the modification of Tamano’s cathode to have two or more layers is in the vague “as required” phrase.

Given that requirement of the material for Tamano’s cathode is “suitably selected from those having a work function of smaller than 4 eV”, and that any of the materials listed fulfils this requirement, the “as required” phrase in Tamano clearly does not provide any motivation for specific cathode structures having two layers of different composition, much less the specific compositional limitations of claim 2. This point is supported by the fact that Tamano’s cathode and anode are both mentioned as having two or more layers in the same sentence, despite the general difference in the materials making up the cathode and anode (compare column 24, lines 32-34, to column 24, lines 40-42).

Appellants therefore submit that the indication in Tamano et al. that the cathode “may be formed of two or more layers” **appears to be only a suggestion for two or more layers formed of the same material**. Presumably, the “as required” phrase refers to a general structural or manufacturing requirement in which making two or more layers is useful.

In the Response to Arguments in paragraph no. 8 of the final Office action, the Examiner discusses column 24, lines 47-48 of Tamano et al., noting again that Tamano’s cathode may be

formed of two layers, and that it may include materials such as magnesium and calcium. The Examiner then states:

“The examiner submits [that] the layers disclosed by Tamano et al. read upon the layers applicant is claiming, because they are comprised of the same materials and intended use is not patently significant. Recitation of a newly disclosed property does not distinguish over a reference disclosure of the article or composition claims. ... Applicant bears responsibility for proving that the reference composition does not possess the characteristics recited in the claims. ...”

Appellants respectfully submit that the Examiner’s reasoning here is improper. The Examiner appears to be stating that the claimed first and second conductive films are disclosed as Tamano’s “two or more layers”. However, the Examiner’s comment does not address the specific structural compositional limitations of the first conductive film and second conductive film in claim 2, and there is no question that Tamano et al. does **not** disclose the limitations of claim 2 (that is, claim 2 is not anticipated). Moreover, claim 2 does not recite any particular property resulting from the claimed structure. The Examiner’s reference to “recitation of a newly discovered property” would be relevant only for a claim that was otherwise anticipated by a reference except for the recitation of a property not mentioned in the reference. The Examiner’s argument is inappropriate for claim 2, which is clearly not anticipated by Tamano et al. and which does not even recite any particular property resulting from the claimed structure.

The Examiner then states:

“Furthermore, in response to applicant’s argument that a film for preventing oxidation is not taught by Tamano et al., a recitation of the intended use of the claimed invention must result in a structural difference between the invention and the prior art in order to patentably distinguish the claimed invention from the prior art. ...”

Here, the Examiner apparently refers to Appellants argument made on page 3, line 6, of the Response dated November 26, 2003. However, Appellants' argument was addressing the apparent lack of motivation in Tamano et al. for a film corresponding to the second conductive film in claim 2. There is no corresponding recitation of intended use in claim 2, and Appellants respectfully submit that this argument by the Examiner is irrelevant.

Appellants therefore submit that claim 2 is unobvious over Tamano et al. (U.S. Patent No. 5,811,834).

B. Whether claim 20 is unpatentable under 35 U.S.C. 103(a) over Tamano et al. (U.S. Patent No. 5,811,834) in view of Arai et al. (U.S. Patent Publication No. 2001/0041268).

1. Errors in the rejection

In this section (section VIII.B.1.) of the Appeal Brief, Appellants address the errors in the rejection as stated by the Examiner. In section VIII.B.2., below, Appellants address how the limitations of claim 20 render the claim unobvious over the prior art and Appellants address the Examiner's "Response to Arguments" from the final Office action.

In paragraph no. 7 of the final Office action dated November 26, 2003 (paper no. 9), the rejection of claim 20 is maintained as set forth in paragraph no. 11 of the Office action dated June 23, 2003 (paper no. 7). In the rejection in that Office action, the Examiner cites column 23, line 56, through column 24, line 48, of Tamano et al. as disclosing organic electroluminescent devices comprising organic material between electrodes. The Examiner then states:

"Although Tamano et al. fails to exemplify a device comprising a cathode comprising two layers wherein the layer closest to the organic layer is an alkaline metal or alkaline earth metal and the outermost layer is comprised of titanium or ruthenium, it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed such a layered cathode, because Tamano et al. teaches a two layered cathode may be formed and teaches all of the required elemental materials."

The Examiner then states that: "Tamano et al. fails to teach a protective layer over the cathode of the device." Arai et al. (page 3, paragraph [0045] is cited for teaching a protective electrode over the cathode comprising titanium nitride, for stabilizing the efficiency of electron injection and for increasing the lifetime of the device. The Examiner states that it would have been obvious to add a protective electrode over the Tamano cathode because Arai teaches the benefits of a protective layer to increase the durability of an EL device.

Appellants submit that there are errors in the Examiner's proposed combination of references, and that a proper *prima facie* case has not been stated.

The combination proposed by the Examiner is the addition of Arai's protective electrode over Tamano's cathode. Arai's protective electrode is on the electron injecting electrode, on the surface of the electron injecting electrode which is situated remote from the organic layer. The protective layer in Arai contains at least one of aluminum, a mixture of aluminum and a transition metal (excluding titanium), titanium and titanium nitride. The Examiner is apparently selecting the case where the protective electrode is made of titanium nitride.

Claim 20 requires a cathode with at least three layers: 1) a first conductive film contacting the EL layer and having an alkaline earth or an alkaline earth metal; 2) a conductive film containing Ru, Rh, Ir, Os, Re or an oxide Ru, Rh, Ir, Os and Re, which is part of the laminated second

conductive film; and 3) any one of a TiN film and a laminate film formed of a Ti film and a TiN film on said Ti film, which is also part of the laminated second conductive film.

In the Examiner's rejection, layer (3) would have to be a TiN film, corresponding to Arai's protective film.

The error in the rejection of claim 20 in Issue B is essentially the same as the error in the rejection of claim 2 in Issue A. That is, the first conductive film in claim 20 is recited in the same manner as the first conductive film of claim 2. The "conductive film" which is the first recited part of the laminated second conductive film in claim 20 has the same composition as the second conductive film in claim 2. In the rejection, the particular structure of these two films in claim 20 are stated as having been obvious over Tamano et al, "because Tamano et al. teaches a two layered cathode may be formed **and teaches all of the required elemental materials**" (emphasis added).

That is, as discussed above for Issue A, the Examiner has failed to indicate an actual suggestion in Tamano for the particular structural limitations of these two films in the claims. The statement that Tamano "teaches all of the required elemental materials" does **not** point out any suggestion in Tamano for any particular composition of the layers if two or more layers are present in the cathode. The Examiner has failed to provide a suggestion or motivation in the reference for these limitations of the claim.

Accordingly, the Examiner has not stated a proper *prima facie* case of obviousness for the rejection.

2. The specific limitations in the rejected claims which are not described in the prior art relied on in the rejection, and how the limitations render the claimed subject matter unobvious over the prior art.

As discussed in section VIII.B.1., the Examiner has failed to point out any suggestion or motivation in Tamano et al. for the particular limitations in claim 20 that there be a “first conductive film containing any one of an alkaline metal and an alkaline earth metal” laminated to “a conductive film containing any one of at least one type metal selected from the group consisting of Ru, Rh, Ir, Os, Re and the oxides of Ru, Rh, Ir, Os and Re”. (Arai et al. was not cited as providing a suggestion for these limitations). Appellants submit that there is no suggestion for these structural/compositional limitations in either Tamano et al. or Arai et al.

Appellants arguments that there is no suggestion for these limitations in Tamano et al. are similar to Appellants arguments in section VIII.A.2., that there is no suggestion in Tamano et al. for limitations on the first conductive film and second conductive film of claim 2.

The only suggestion in Tamano et al. for a cathode with more than one layer is in the sentence: “Each of the anode and the cathode may be formed of two layers or more as required”. Appellants have noted previously that the meaning of “as required” is not explained, and that the fact that this sentence refers to both the anode and the cathode, which are of quite different compositions, implies that no particular combination of structure and composition is being suggested. Given that column 24, line 40, refers to the “electrically conductive **material**”, in the singular, Appellants interpret the “as required” phrase to refer to manufacturing or structural necessity, and submit that all that is implied is two or more layers of the same material. There is clearly no suggestion in

Tamano et al. for two layers with the particular compositional limitations recited for the “first conductive film” and the “conductive film” layer of the “second conductive film” recited in claim 20.

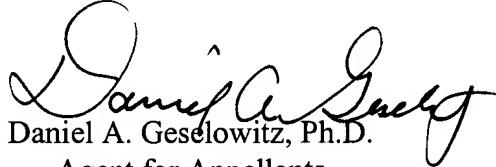
Appellants also submit that there is clearly **no suggestion** for these two layers in Arai et al. Arai et al.’s “protective film” of paragraph [0045] is placed over the electron injecting electrode of paragraph [0038], which can be made of any of the long list of materials in that paragraph. There is no suggestion that there be two layers in the electron injecting electrode. Moreover, although alkali metals and alkaline earth metals are listed in the long list of possible materials for the electron injecting electrode, Ru, Rh, Ir, Os and Re are **not** disclosed as possible materials.

Therefore, neither Tamano et al. nor Arai et al. provides any suggestion or motivation for a cathode having the limitations of the “first conductive film” and the “conductive film” layer of the “second conductive film” recited in claim 20. No *prima facie* case of obviousness for claim 20 can be made using this combination of references, and claim 20 is unobvious over Tamano et al. and Arai et al., taken separately or in combination.

In the event this paper is not timely filed, appellant hereby petitions for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP



Daniel A. Geselowitz, Ph.D.
Agent for Appellants
Reg. No. 42,573

DAG/plb:mla:xl

Atty. Docket No. **010935**
Suite 1000
1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930



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PATENT TRADEMARK OFFICE

Enclosure: Appendix

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IX. APPENDIX-CLAIMS INVOLVED IN THE APPEAL

(Claims 2 and 20 are on appeal)

Claim 2. An organic EL element comprising:

an organic EL layer formed between an anode and a cathode; and

said cathode consisting of a first conductive film that contacts to said organic EL layer and a second conductive film that constitutes a laminated structure together with said first conductive film, said first conductive film containing any one of an alkaline metal and an alkaline earth metal, and

said second conductive film containing any one of at least one type metal selected from the group consisting of Ru (ruthenium), Rh (rhodium), Ir (iridium), Os (osmium), Re (rhenium) and the oxides of Ru, Rh, Ir, Os and Re.

Claim 20. An organic EL element comprising:

an organic EL layer formed between an anode and a cathode; and

said cathode consisting of a first conductive film that contacts to said organic EL layer and a second conductive film that constitutes a laminated structure together with said first conductive film, said first conductive film containing any one of an alkaline metal and an alkaline earth metal, and said second conductive film is formed of a laminated film consisting of:

a conductive film containing any one of at least one type metal selected from the group consisting of Ru, Rh, Ir, Os, Re and the oxides of Ru, Rh, Ir, Os and Re, and

any one of a TiN film and a laminate film formed of a Ti film and a TiN film on said Ti film.